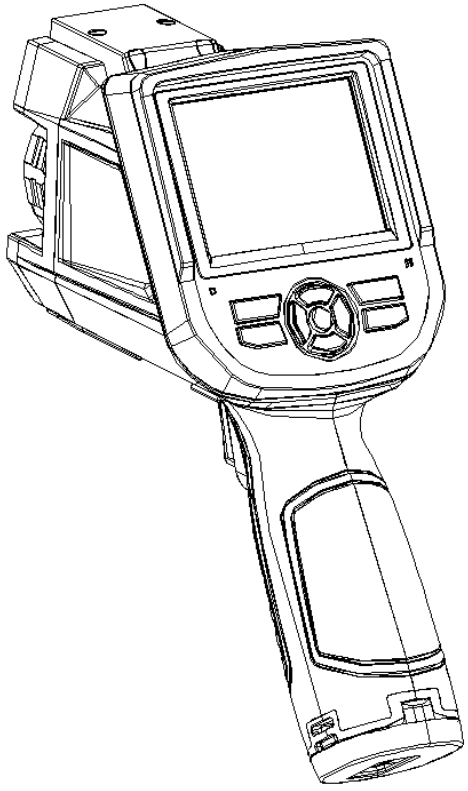
LT4/T8

Thermal Image Camera

User Manual



! Warnings, Cautions and Notes

Definitions

! **WARNING** Could cause bodily injury or death.

! **CAUTION** Could cause damage to equipment or permanent loss of data.

! **NOTE** provides useful information to the operator.

Important Information – Read before using the Instrument

! **WARNING** – Laser Radiation is emitted from this device. **Do Not** stare into Laser Beam.

Class 2 Laser, 635 nm, 0.9mW

! **CAUTION** - Never point the lens directly toward a strong radiation source (ie. Sun, direct or reflected laser beam, etc), with power on or power off, as damage may result to the thermal detector used inside. **Permanent damage may result!**

! **CAUTION -** The original shipping carton should be kept for use for future transportation. Do not drop, shake or impact the thermal imager excessively, in use or during transportation.

! **CAUTION -** Store the unit in its original case in a cool, dry, well-ventilated area away from strong electromagnetic fields.

! **CAUTION -** Protect the surface of the lens from being stained or damaged by foreign objects such as sludge or chemicals. Please replace the lens cap after use.

! **CAUTION -** Please remember to backup image data regularly to avoid losing important data.

! **NOTE** - For maximum measurement accuracy, allow 3 to 5 minutes for camera to stabilize after initial power up.

! **NOTE** - Each camera is factory calibrated. It is recommended that calibration be performed every 12 months.

! **CAUTION -** Do not open case. Unit does not contain any user serviceable parts. Repair should be performed by factory authorized technicians only.

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1 Introduction

Thank you for choosing DALI Instruments “LT4” or “T8” hand-held infrared thermal imager.

Model Identification

LT4 imagers use the detector with 25um 160*120, and measurement range from -20°C～+350°C

T8 imagers use the detector with 25um 384*288, and measurement range from -20°C～+600°C

Features

LT4\T8 include the following features:

11 user selectable color palettes

11 user selectable languages

2X， 4X digital zoom

5 removable spot measurements

5 Areas measurements

2 lines measurements

Custom shortcuts

Blue tooth

Power saving mode

LCD Brightness adjustment

Video Output – NTSC or PAL

Internet settings

Time and Date settings

Factory settings restore

TF card uninstall, formatting

TF card image storage, video storage

Text and Audio annotation via image storage

Consecutive image shot storage

Alarm image capture

Alarm video record

Isotherm measurement function

Temperature measurement settings

Built in Emissivity Table list of common materials

CMOS visible image and storage

Infrared and visible image fusion

Merge set

Upgrades and Options

LT4&T8 Series models are factory upgradeable for Wide Angle or Telephoto Lenses.

LT4&T8 Series models are factory upgradeable for high temperature expansion lens to a wide temperature measurement range.

Applications:

Preventive maintenance

- Power industry: Power line and power facility thermal state checking; problem and defect diagnosis.
- Electrical system: Identify potential circuit overloads.
- Mechanical system: Reduce downtime and avoid catastrophic failure.

Construction science

- Roof: Quick identification of water penetration problems.
- Structure: Commercial and residential energy audits.
- Moisture detection: Determine root cause of moisture and mildew.
- Evaluation：Evaluate the resolution to ensure the area completely dry.

Others

- Iron and steel industry: Inspect steel refining and rolling processes; diagnose hot-blast stove defects; detect the embryo temperature of armor plate, etc.
- Fire fighting: Forest fire prevention and detection of latent ignition source. Preventive detection on specific materials of auto-ignition. Detection

of potential spark ignition sources.

- Medical: Human body surface temperature detection and screening.
- Petro/chemical: Oil pipeline status inspection; material surface temperature detection; insulation inspection; power equipment status, etc.

1.1Standard accessories

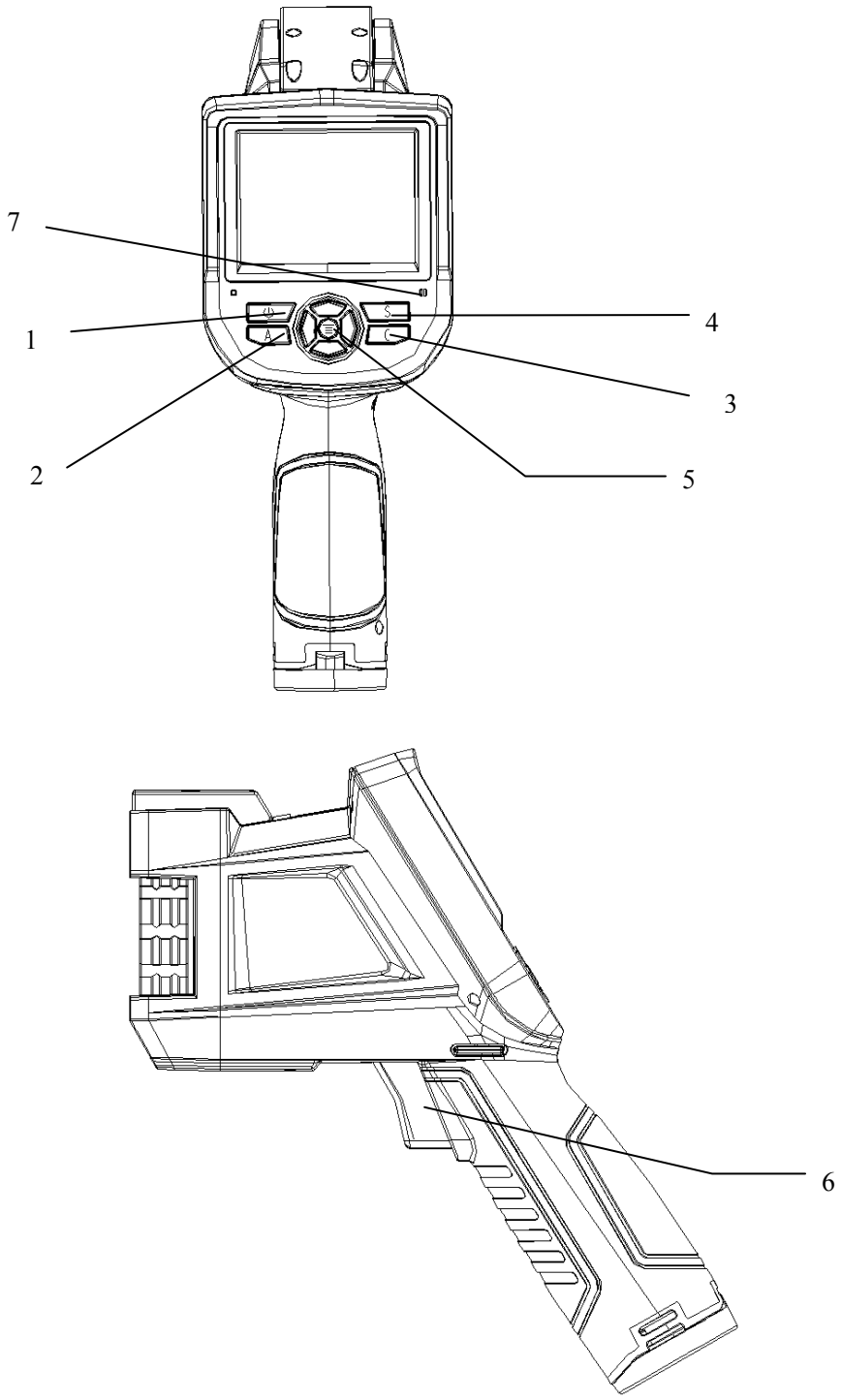
- Infrared thermal image camera (with wrist strap)
- Carrying case
- Video out cable
- Lithium ion batteries（2）
- User manual, Infrared report and analysis software system CD
- Lithium battery charger
- Lens cap
- TF card
- TF card reader
- USB cable

1.2 Optional accessories

- External 0.5x wide-angle lens
- External 2x telescopic lens
- Eye patch
- Power adapter（with power cable and plug）
- European standard plug
- British standard plug
- Australian standard plug

2 Camera overview

2.1 Function keys



[1] Power key

Press and hold the Power Key for > 3 seconds to power on/off the camera.

! Note: After powering off, please wait ten seconds before powering the camera on again.

[2] Select/Auto key (Marked "A")

The "A" or attribute button performs 2 functions.

a) The first function is modification of selected parameters. It is obtained by a quick press and release (less than 2 seconds), with this functions to modify their parameters. Subsequent presses will "scroll" through the available parameters. The selected function will be highlighted in yellow. The functions include:

- **Measurement points, areas, and lines**

Points, areas, lines – switching the added points, areas and lines in the interface from Up to Down, press Menu to set properties, press C to delete the selected measuring objects.

Color Palette

Pressing the left or right arrows will scroll through the available color palettes, displaying their name above the palette. The selected palette will become active after about 3 seconds of selecting it and will be set as the default power on palette.

- **Level/Span values**

Pressing the left or right arrow will reduce or increase the Span and pressing the up or down arrow will reduce or increase the Level. If the unit is in Automatic mode, modifying any of these parameters will select Manual mode.

b）The second function performed is to force an internal calibration cycle. This is performed by pressing and holding the **A** key for 5 seconds or more. The camera will make automatic correction to get the most accurate thermal measurement.

c) Image transmission via blue tooth. Open blue-tooth, select object image,

short press **A**, it will display sending dialog.

[3] Cancel/Camera key (Marked "C")

- Pressing and releasing the **C** key cancels the present operation when in M**enu** mode.
- Pressing and releasing the **C** key when an image is frozen or being viewed from memory, will return to real-time measurement status.
- When not in menu mode or parameter editing, pressing and releasing the **C** key will toggle between the thermal image and the visible CCD camera image.
- When a parameter is selected, such as a measurement cursor, pressing the **C** key will delete the highlighted measurement.

[4] Freeze/Save key (Marked "S")

Used for freezing or saving thermal image. Press the key once to freeze the image. Press Confirm to save the image or Press C to return to real-time measurement. If Audio recording is enabled, Audio comment dialog box will display. In document management, press S to delete video or image.

[5] Menu/Confirm key (bar)

Includes **Up**, **Down**, **Left**, **Right** and **Menu/Confirm** (center) keys. Function varies with operation mode.

In **Menu mode**, it is used for menu selection. **Up** and **Down** keys are for same level of menu operation. **Left** and **Right** keys are for different levels menu operation. **Confirm** key (center) is to activate the menu and confirm the choice.

In **Image mode**, press **Up** or **Down** key to activate X2 digital zoom. The screen will display "X2" in the upper left corner. Press **Up** or **Down** key to return to the original image.

In **Spot Measurement** editing mode (activated immediately after adding a spot or by selecting via the **A** key), press the **Menu** key to pop up the

attribute box. Press four navigation keys to move the spot location.

In line temperature measurement editing mode (activated immediately after adding a line or by selecting via the **A** key), press the **Menu** key to pop up the attribute box. If measurement line is horizontal, press **Up** and **Down** keys to move the line location; press **Left** and **Right** keys to move the reference line. If measurement line is vertical, press **Left** and **Right** keys to move the line; press **Up** and **Down** keys to move the reference line.

In area measurement editing mode (activated immediately after adding an area or by selecting via the **A** key), press the **Confirm** key to pop up the attribute box. Select in the attribute box the parameter to be edited, either size or position. Press the four navigation keys to move the area location or change the size of the area.

[6] Trigger/Shortcut key

The trigger key serves as a shortcut to access the following functions:

Laser – Pulling trigger activates laser sight and releasing deactivates it.

Spot, Area– Pulling and releasing trigger adds a spot or area. Pulling and releasing trigger again removes the spot or area.

Video and Image Save –pressing to initiate a Save cycle.

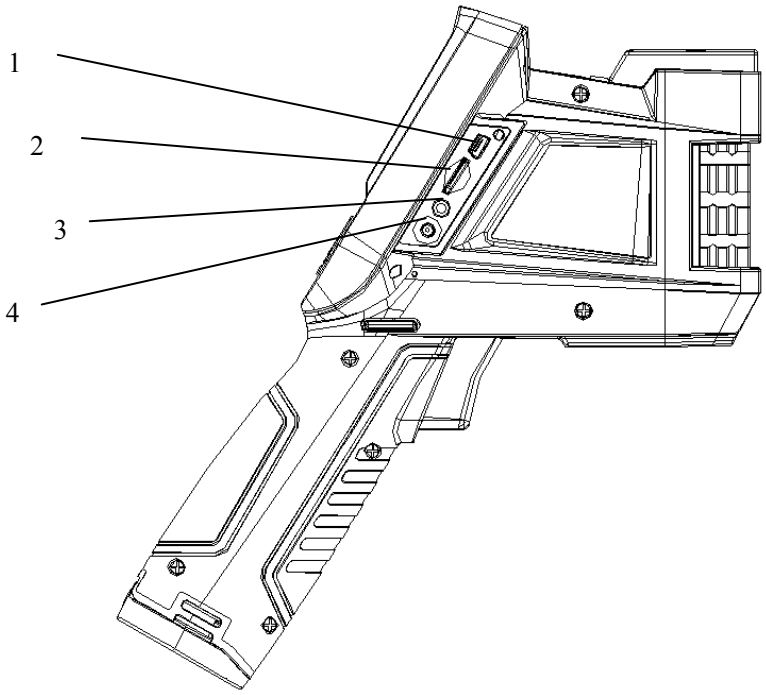
Zoom-pressing to zoom the infrared image

LCD brightness adjustment-pressing to activate

[7] Microphone

Used for recording a voice message with the Saved image

2.2 Interface



[1] USB to RJ45 output

Used for internet connecting.

[2] TF Card slot

Accepting standard size TF card such as supplied 2GB capacity card, for device upgrade or image storage.

[3] Video port

It is a video output interface.

[4] Power interface

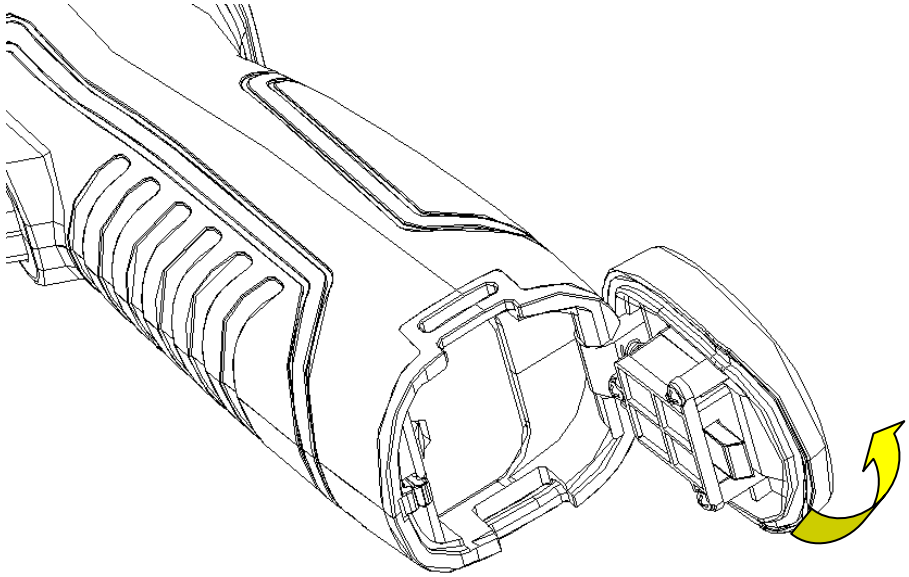
External power input interface. Power source should be +12VDC. Center pin is positive terminal.

3 Basic operation

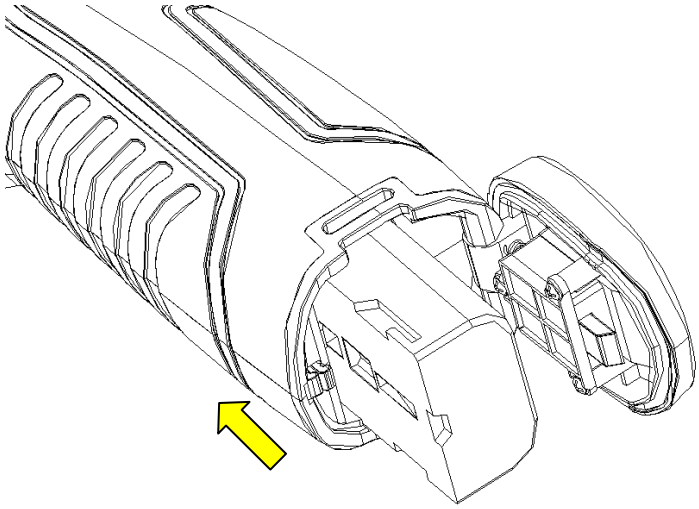
3.1 Battery Installation and Replacement

3.1.1 Inserting or removing battery

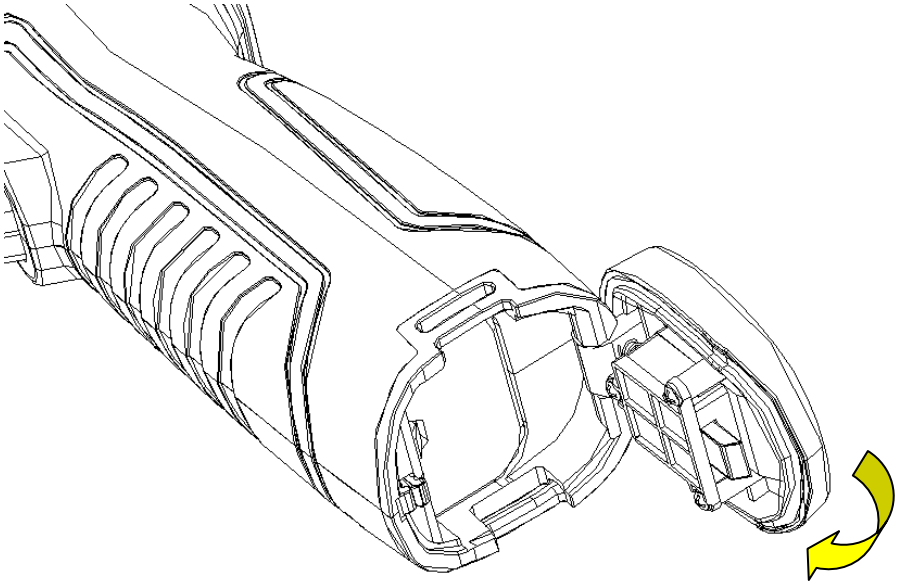
Battery compartment is located inside the handle. Turn the cover counter-clockwise to remove. Remove battery for replacement.



Insert the battery (the battery contacts must face into the battery compartment).

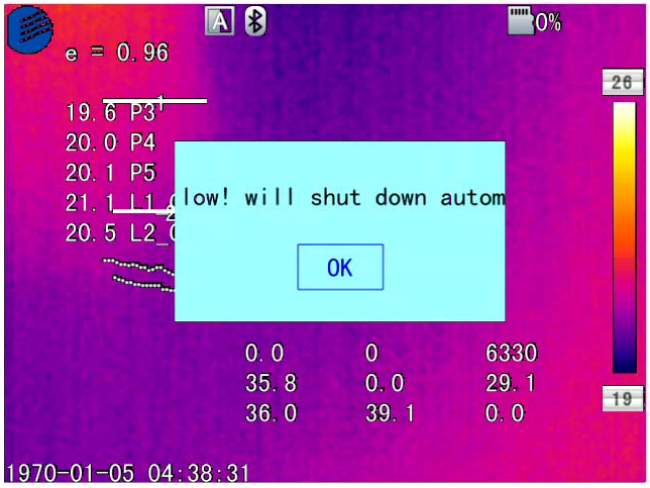


Replace the cover and screw down.



! CAUTION: Use only original manufacturer replacement battery. Use of incorrect battery may result in physical or electrical damage to the instrument due to incorrect voltage or physical size difference.

3.1.2 Replacing battery



When battery displays empty and flashes for about 1 minute and 50 seconds, the instrument displays a low battery dialog and shut down automatically after about 10 seconds.

It's better to replace batteries now.

3.2 Battery safety and usage

- Batteries should be stored in an ambient temperature of -4°F (–20°C) to 67.9°F (+20°C). Lithium batteries will self-discharge during storage, so they should be fully charged before storage. Self-discharge may affect long term battery performance. Furthermore, it is recommended that the battery should be charged in a set time, as below;
  Ambient temperature of:
  - -4°F (–20°C) to 67.9°F (+20°C), once every 6 months
  - 67.9°F (+20°C) to 113°F (+45°C), once every 3 months
  - 113°F (+45°C) to 149°F (+60°C), once every month
- Battery should have greater than 50% charge prior to recharge.
- The ambient temperature for charging should be 32°F (0°C) to 104°F (+40°C). If under 32°F (0°C), the battery capacity will be diminished; if over 104°F (+40°C), the battery may overheat, resulting in permanent damage.

! **WARNING:**

! Never disassemble, incinerate or puncture battery

! Never short circuit the battery

! Keep battery dry

! Keep out of reach of children

! Always dispose of battery in accordance with local, state and federal regulations

3.3Quick access

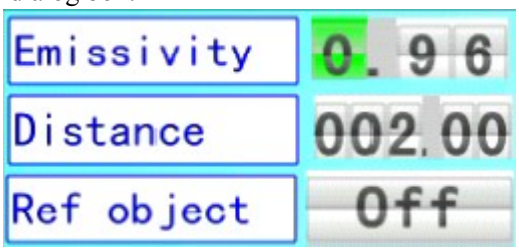
3.3.1 Capture an image

- After installing the battery, press and hold the power key (≥3 seconds) until the display comes on. After approximately 50 seconds, the power on routine will finish and the camera will start its measurements.
- Remove the lens cap and aim at the target. Adjust the focus for the clearest target thermal image.

! Note：Focus is not clear, and will lead to measurement error.

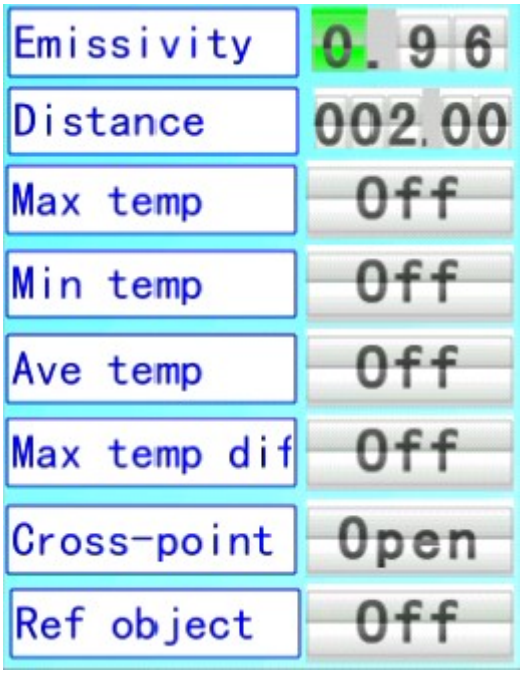
3.3.2 Temperature Measurement

- To move the target object to the screen on the point of crossing temperature, the upper-right corner of the screen shows "XX" is the temperature measurement point at the target temperature. If you want to measure more accurately, keep press the "A" button for 3 seconds。
- If wish to detailed analysis the thermal image of the current screen, you can press the "S" key to frozen the image, then analysis. Sustainable pressing the "S" key for 3 seconds, the thermal image stored, and then analyzed.
- When the target temperature is greater than or less than the relevant thermal image' Max or Min temperature, the temperature of the screen display> XXX ° C or <XXX ° C.
- If you need to modify the properties of the temperature measurement object, you should first check the temperature of the object, and then press the Enter key, the temperature of the object's Properties dialog box pops up on the screen. The following figure is the temperature measurement points, the temperature line, the temperature measurement area of the Properties dialog box:



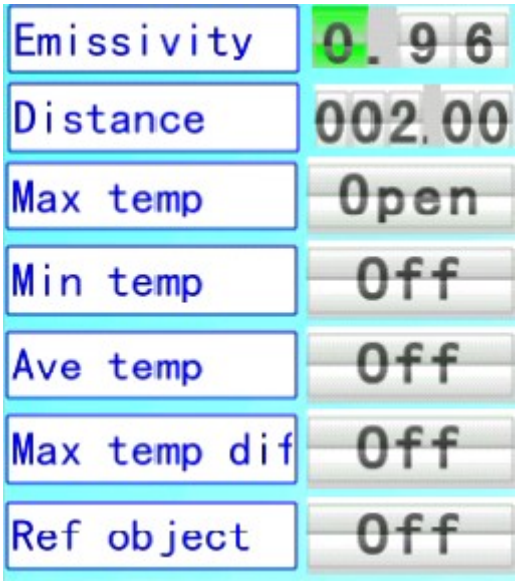
Point Measurement Properties Dialog Box

The attributes of the measurement points can be modified amplitude coefficient ratio, the distance and the reference object, the left and right arrow keys to the left and right selection, press the A key to switch up and down. Temperature value is displayed when the "reference object" option changes to "open", and other measuring object with the temperature difference of the temperature measurement points.



Line Measurement Properties Dialog Box

Line temperature measurement properties can be modified amplitude coefficient ratio, distance, maximum temperature, minimum temperature, average temperature, maximum temperature difference, the crossing point temperature and the reference object, the left and right arrow keys to the left and right selection, press the A key to switch up and down. Temperature value is displayed when the "reference object" option changes to "open", and other measuring object with the temperature difference of the temperature measurement points.



Area Measurement Properties Dialog Box

Area temperature measurement properties can be modified amplitude coefficient ratio, distance, maximum temperature, minimum temperature, average temperature, the maximum temperature and the reference temperature properties can be modified, and the

left and right arrow keys to the left and right selection, press the A key to switch up and down. Temperature value is displayed when the "reference object" option changes to "open", and other measuring object with the result of the temperature difference between the temperature measurement of the temperature measurement area

! Note: It can only set one reference target.

3.3.3 Save Image

Obtain the current image to store, you can choose one of the following four ways：

- Press Ok button and will show panel menu, select the "photo" option in the menu, the system will automatically save images
- Press S key, the image will froze, and press the same key again and the image will be saved.
- Keep press S key for 3 second, the image will be automatically saved.
- To set a shortcut key as Take Photo, then just need press this key to save image.

3.3.4 Playback Image

- Two way to open the image file：

1、 Press the Ok key to activate the main menu, select "File Manager" menu , then select the submenu (via the arrow keys to select)

2、 Click the "Preview" option in the floating panel to open the selected file (via the left and right keys to switch selection)

- After you open the image, you could use upper and lower sections of the playback control panel keys to playback the current store images.
- Press Cancel key to exit and return to the current state.

3.3.5 Download the Save Files

Can use card reader to download, delete, format the TF files.

! Note: Use the recommended form to format the TF card。

3.3.6 Screen Setting

There’s two ways to set up: 1) Via general setup menu of “LCD brightness adjustment” to do screen brightness settings, so as to achieve the best effect. 2) by setting shortcut keys for the “LCD brightness adjustment”, then use the shortcut key to adjust the LCD screen brightness.

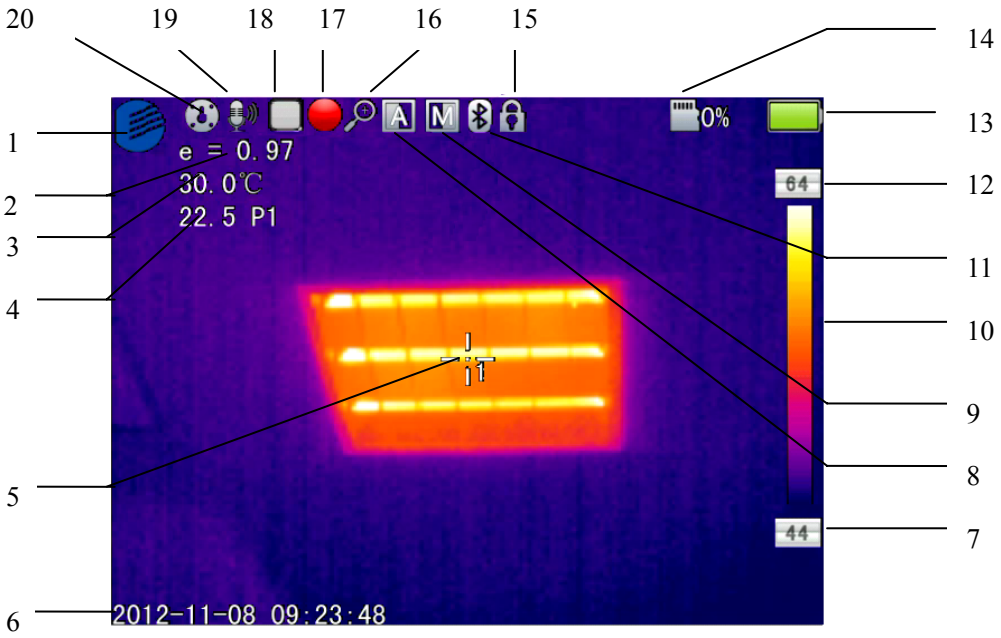
3.3.7 Manu Operation Introduction

- Keyboard operation: press the "OK" button to pop up the floating panel, use left and right arrow keys on the floating panels to select the icon, click "OK" key to enter the relevant interface.
- Main menu interface: via "up and down" key to select the menu icon, click "OK" key to enter the submenu.
- Sub-menu interface: via "up and down" key to select, if there's the ">" mark, using right-click to enter the lower menu
- Parameter interface: The "up and down" key is to modify, the "left and right" key is to choose
- < > means modify the setting of the current manu.
- Press the "OK" button to confirm the changes, save and return to the previous menu, press the "C" key to cancel the changes and return to the previous menu.
- Cancel and return to the previous menu button; Save and return to the previous menu button. (For touch screen)
- Switch button, by the left and right keys to modify the switch settings

4 Operation guide

4.1 Graphic interface description

4.1.1 Screen graphic interface



[1] Company logo： DALI

[2] Emissivity： the current emissivity setting

[3] Reference Temperature： Fixed reference temperature

[4] Result： Indicates the temperature value of the target object. Black and yellow denotes the temperature value of the selected object.

[5] Spot temperature measurement： white crosshair

[6] System： the current system time

[7] Min temperature： indicate minimum value of the palette

[8] Auto Enhancement： select auto enhancement mode

[9] Manual Enhancement： select manual enhancement mode

[10] Palette： palette bar. User can choose different palettes

[11]Bluetooth： select Bluetooth function

[12] Max temperature： indicate the max value of the palette

[13] Battery status： indicate the current battery status

[14] TF card： indicate the TF card load status

[15] Freeze logo： indicate the current image is frozen

[16] Zoom： indicate the image is zoomed

[17] Recording： indicate the recording status

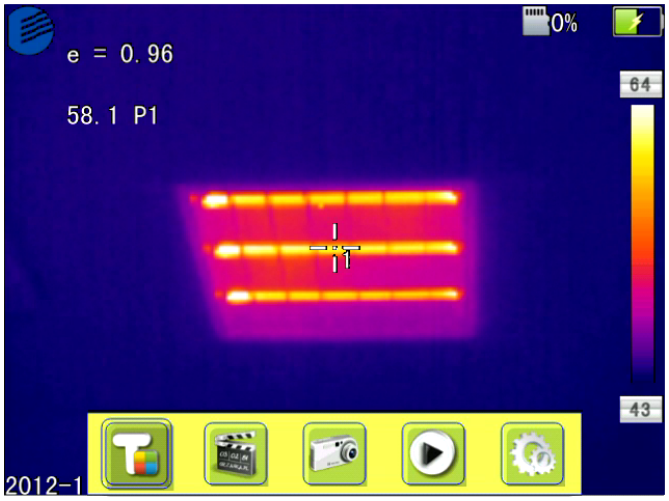
[18] Continuous snap-shot： indicate the continuous snap-shot status

[19] Voice recording： indicate the voice recording status

[20] Calibration： indicate the calibration status

! NOTE: Not all models have all functions, so the working status screen may not show all features.

4.1.2 Floating Bar Interface



Floating bar interface

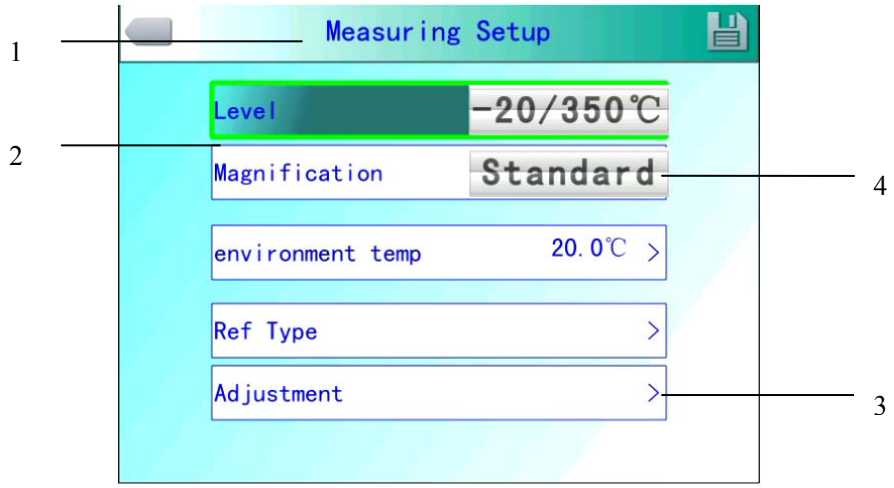
Floating bar interface：From left to right is namely the temperature measurement, video, photo, preview and settings manu.

4.1.3 Main Manu

Main Manu

The main menu items: display the main menu item, namely the document management, temperature settings, image settings, camera settings, general settings, network settings, TF card management and system setting.

4.1.4 Sub-manu interface



Sub-manu interface

[1] Figure name: Displays the name of the dialog box. The name of the dialog box as shown in the example is "temperature measurement setting.

[2] Item title: A dialog box may contain more than one item. As shown in the above figure

[3] Item Content: each item corresponds to the content of a project, the left and right keys to make changes, ">" indicates the lower menu.

[4] Parameter options: press the left button to select a different parameter.

4.2 Measurement Object Adding

This feature is used to increase or clear the measuring object. The following dialog box pops up, press the Enter key, floating menu pops up, select the temperature measurement target to add and press the Enter key.

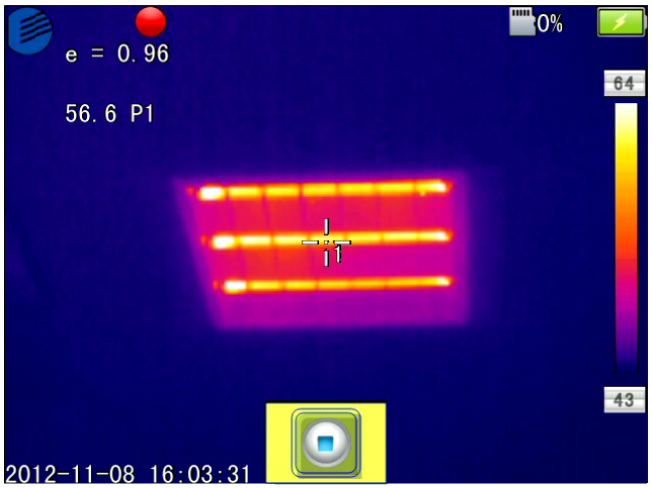
Temperature Measurement Object Adding Manu

If select “ ”， then press OK key， then the all the objects will be cleared.

! NOTE: When you delete a single temperature measurement object, direclty press “A” key and choose the object, then press the "C" key to delete.

4.3 Recording

This function is used to save the video, save format to MP4. Pressing the Enter key, floating menu pops up, select video and press the Enter key, as shown below.

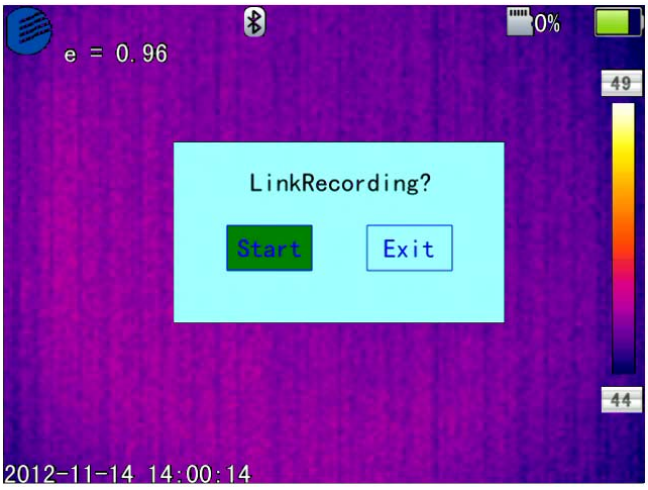


Recording Figure

Press stop key to end the recording, and return to the current operation status

4.4 Photo

This item is for photo. And back up in the JPG format. Pop up the floating menu after pressing confirming key. Then finish the photo. If turn up function of mark. Backup note will pop up in the OSD as followed.

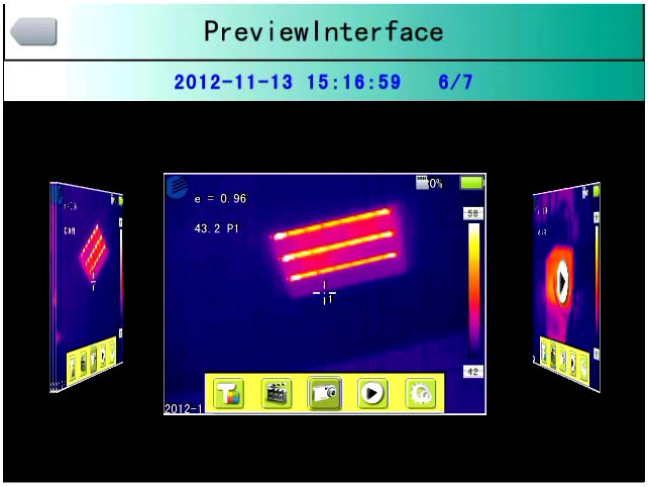


Voice record note for photo

Continuous photos mark will appears in the status column if set the continuous photo

4.5 Preview

This item is for the preview files of backup. Press confirming key. Pop up the floating items，select preview and press confirming key will appears as followed .

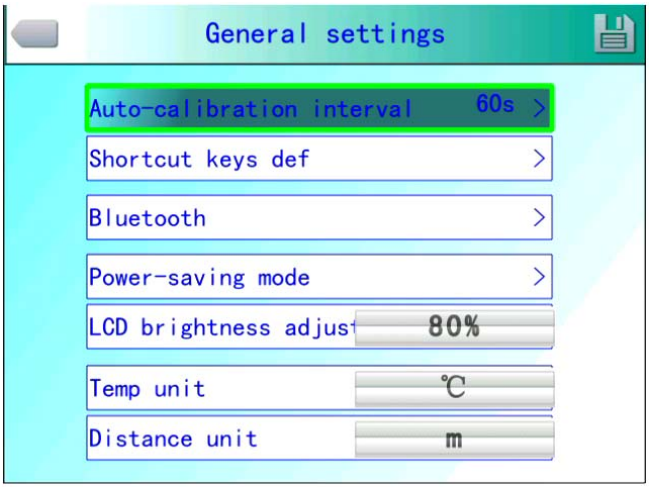


Preview OSD

Switch to files by pressing key of left or right. Open it and it appears in the screen by pressing confirming key. Press C key to quit

4.6 Setting

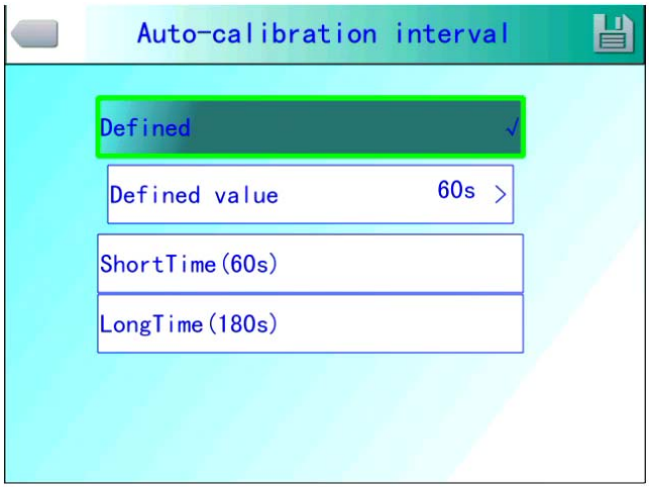
Main OSD



Normal setting OSD

Press confirming key will pop up the panel and select the SETTING to open the main menu. Select the Normal setting in the main menu. Normal setting OSD will pop up after pressing confirming key. Users could set the time of auto calibration / definition of shortcut key /Bluetooth/pattern of power saving/ brightness adjustment of LCD / unit of temperature / unit of distance .totally 7 items. Switch to items by pressing key of up or down. Change the value by pressing key of left or right. “>” means secondary -menu and enter the menu by pressing key of right .

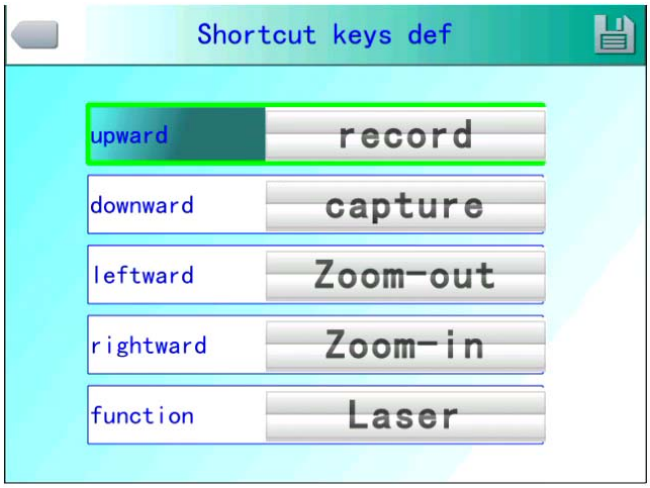
Time of Auto calibration： Set time interval of auto calibration to get better thermal image and improve the precision. The unit is second



Auto calibration OSD

Shortcut key ： Users could set the Functions of shortcut key. System offers record .screenshot. Enlargement. Reduction. Enlarge brightness of LCD. Reduce brightness. of LCD Laser. Lightness. Adding or removing spot 1 of testing temperature. Adding or removing area 1 of

testing temperature and so on. When select shortcut key of laser. It will open the aimer of laser. Then it closes. When select shortcut key of light. It will open the lighting. Then it closes. When select shortcut key of spot 1. It will add or remove the spot 1. When select shortcut key of area 1. It will add or remove the area 1. When select shortcut key of record. It starts to record. When select shortcut key of photo. It starts to save the photos you took.



Shortcut key setting

Bluetooth： Turn on the Bluetooth will enable status of scanning and searching below，Turn off Bluetooth the status is not valid .Select scan and search key and start to scan the Bluetooth device .the model and the name of devices will show in the OSD .Enable status of Bluetooth the device will scan and search one time automatically

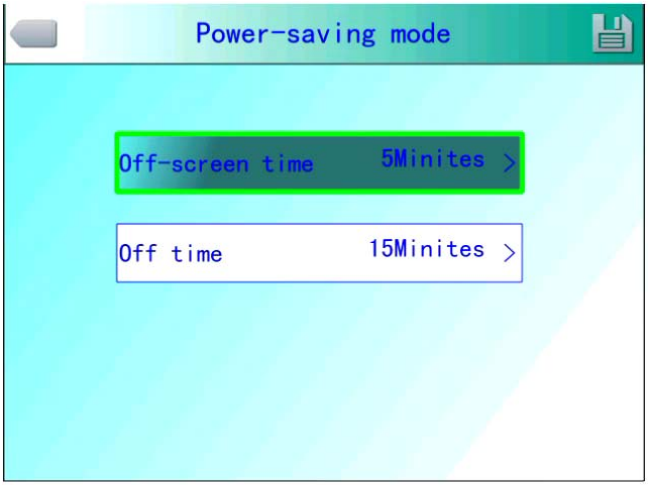
Bluetooth OSD

Power saving： Screen off and power off

Time of scree off： If without any operation，thermal imaging camera will screen off to save power。Press any key except the power key，thermal imaging camera will

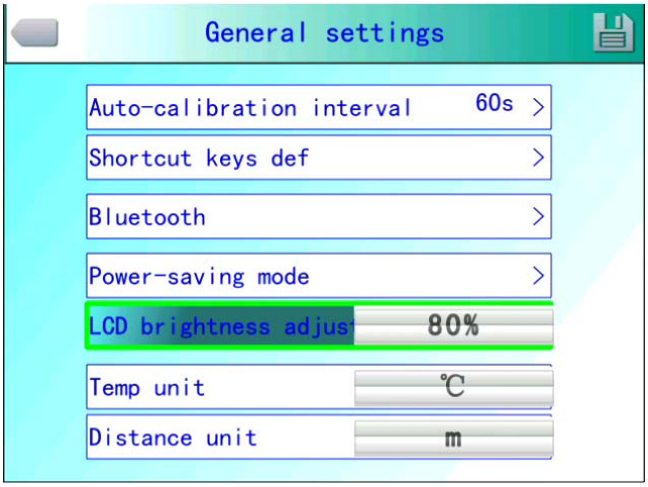
screen on 。This function is not valid when time is set to 00 minute.

Time of power off：If without any operation，thermal imaging camera will power off to save power。This function is not valid when time is set to 00 minute.



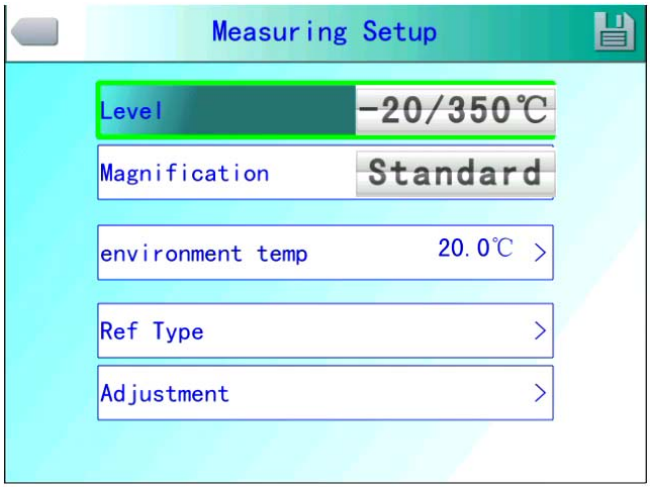
Power saving OSD

LCD brightness adjustment： It is valid when changing the brightness.



LCD brightness adjust OSD

4.6.1 Measuring setting



Measuring setting Menu

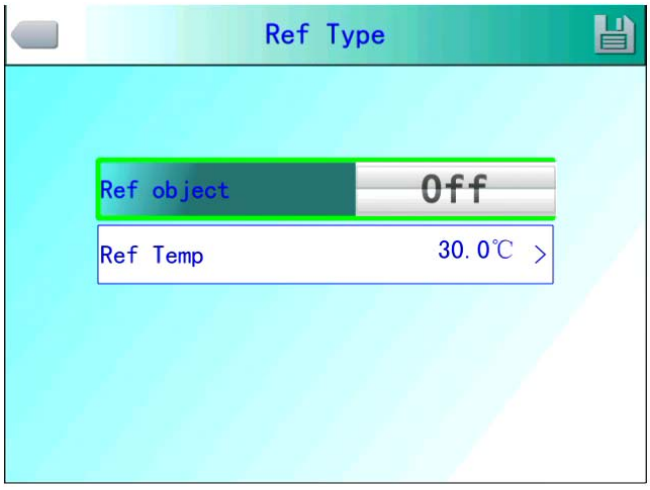
Press OK button to call out the Setting Menu. Select “Measuring Setting”,then press “OK” again to call out the setting interface. In this interface ,Level ,magnification,Environment Temp,Ref Temp can be set. Use UP &Down button to select ,” >” means there is sub menu, press Right Button to enter the sub menu.

Level: Seeting the Measuring Level of the thermal camera.

Magnification: Seeting the Magnification and the different Temp range.

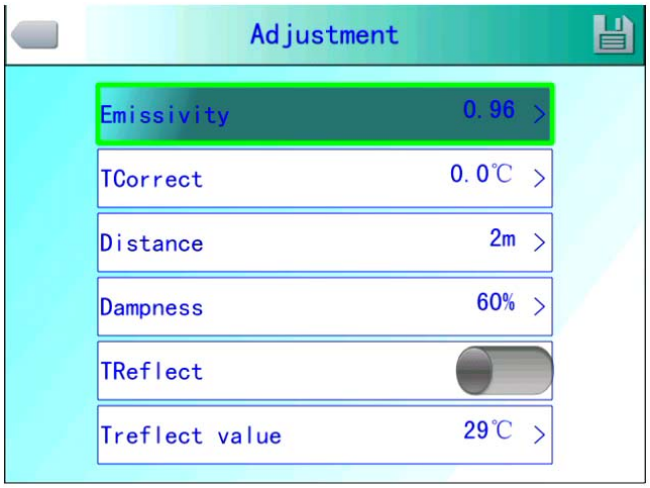
Environment Temp: It will automaticly detect the Environment Temp after the camera start-up.

Ref Temp: When it is enabled , the target temperature shown on the LCD is the D-Value between the real temp and the Ref-Temp.



Ref Temp Menu

4.6.2 Adjustment



Adjustment Menu

Press OK button to call out the "Adjustment" under menu "Measuring Setting". In this menu , Emissivity, Tcorrect, Distance , Humidity ,TReflect can be set. Use UP &Down button to select ,use LEFT & Right to set the value. " >" means there is sub menu, press Right Button to enter the sub menu.

Emissivity: Different target has different emissivity, so the user can set different emissivity for different target. If it is not set , then will use default setting. Attached Common emissivity table for reference.

Tcorrect: Correct the target Temperature.

Distance: Setting the distance between the camera and the target to make sure exact measuring. Set the real distance if the distance is shorter than 10 meters. (unit 0.5m)

Humidity: Set the humidity of the using environment.

TReflect: It will only functioned after it is enabled. Can use fixed temp as reference temperature.

4.6.3 Image Setting

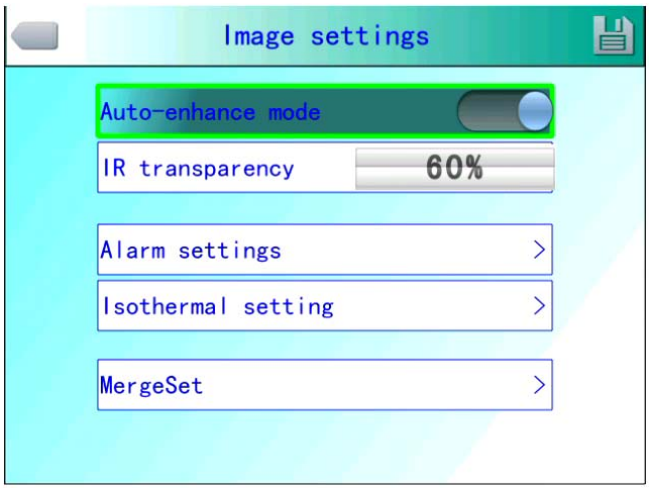


Image Setting Menu

Press OK button to call out the Image setting menu under “Setting” . in this menu , Manual/Auto-Enhance Mode, Alarm types, Alarm Tempe , IR transparency， Alarm color, Alarmlink, Tiem Interval can be set. Use UP &Down button to select ,use LEFT & Right to set the value. ” >” means there is sub menu, press Right Button to enter the sub menu.

Manual/Auto/Auto-Enhance Mode：Adjust the image quality for the user to get better image for analysis purpose

When Auto-Enhance Mode is activated，can switch between manual and automatic. Press “A “ button will enter manul mode,it can adjust the pallet with “UP, Down, LEFT, Right” buttons. Press “C” will return into Auto Mode.

When Auto-Enhance Mode is deactivated，can switch between manual and automatic. Press “A “ button will enter manul mode,it can adjust the pallet with “UP, Down, LEFT, Right” buttons. Press “C” will return into Auto Mode.

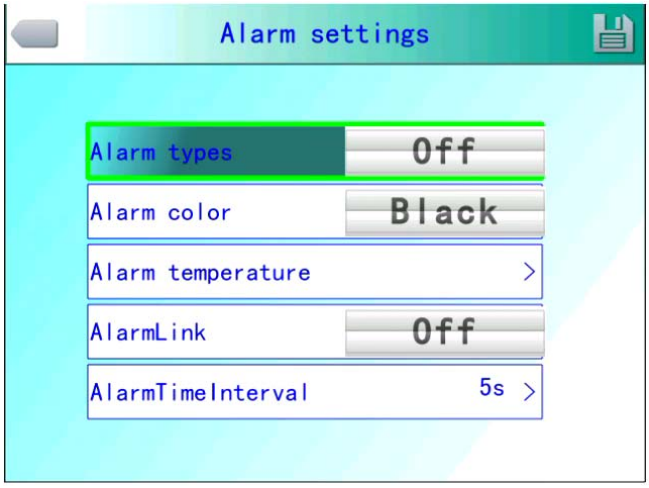
The modes can be switched with the Auto-enhance mode Button.

If select auto mode, the camera will automatic adjust the sense of hierarchicy of the image.

If select “Auto-Enhancement “ , both High temp target and low temp target can be viewed in the image.

If Slect Manual mode, User can set the pallet value to adjust the image quality. Press “UP” button to increase the level range , press Down to decrease the level range. Press Left button to

reduce the upper limit， increase the bottom limit; Press RIGHT button to increase the upper limit, decrease the bottom limit.



Alarm Setting

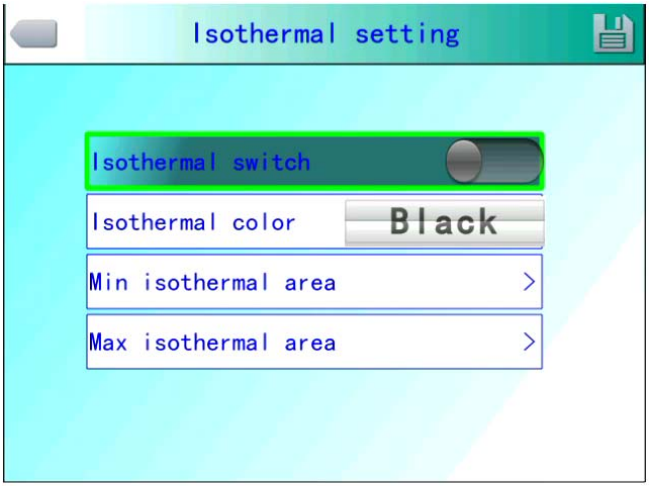
Alarm Types： It is only functioned when measurting. User cab set alarm OFF , High temp alarm，Low temp alarm here. It will alarm when proper setting is selected. Alarm color can be set in “Alarm Color”

Alarm Color： The color of the target area shown on the LCD will be changed into the alarm color set when the temperature is over the alarm temp. 9 color types can be selected. If “colorless” is selected, then the color will not change when alarm.

Alarm Temperature： Setting alarm Temperature. Only functioned when it is enabled。

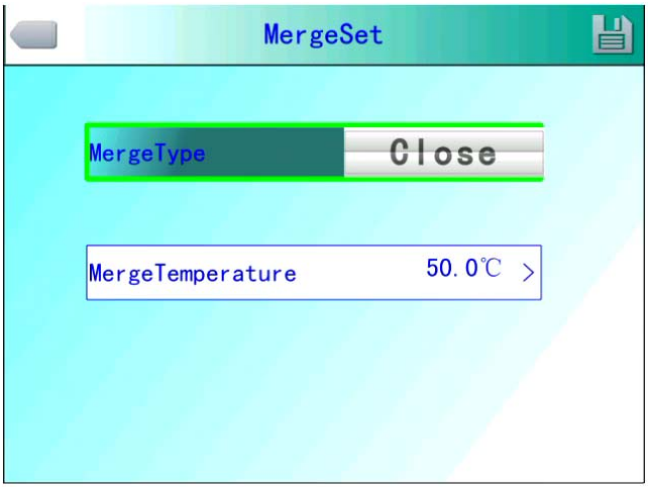
Alarmlink： It will automatic saved when there is alarm including snapshots and video record.

Time Intervel： Set the alarmlink time intervel.



Isotherm Setup Menu

- **Isotherm**：Activates the Isotherm display by displaying the image in the set temperature range by the specified color.
- **Isotherm Color**：9 colors available for your choice，Setting to **Off**, disables the feature.
- **Isotherm low value**：Set the Isotherm low value。
- **Isotherm upper value**：Set the Isotherm upper value。

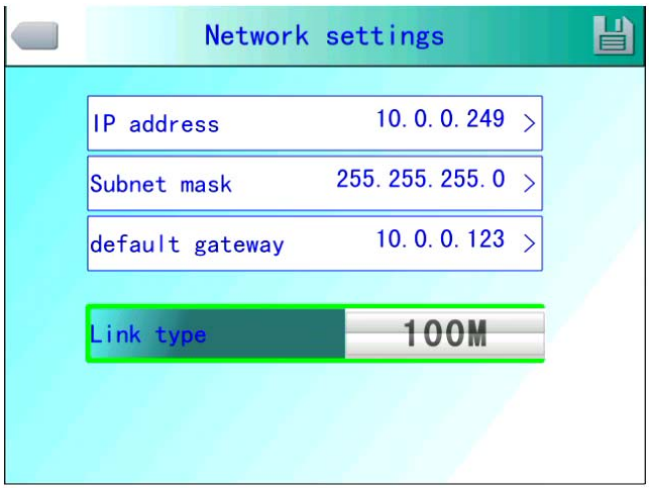


IR Fusion High & Low temperature Menu

IR Fusion High & Low temperature：

It consists of three options--IR Fusion High Temp, IR fusion Low Temp, and OFF. Set IR Fusion High Temp, when the actual temperature is higher than the temperature of IR fusion set up, CCD image will be shown. Vice versa.

4.6.4 Network setup



Network Setup Menu

Press the menu button to show up the floating panel and choose the “setup” option to active the main menu. Select “Network function.

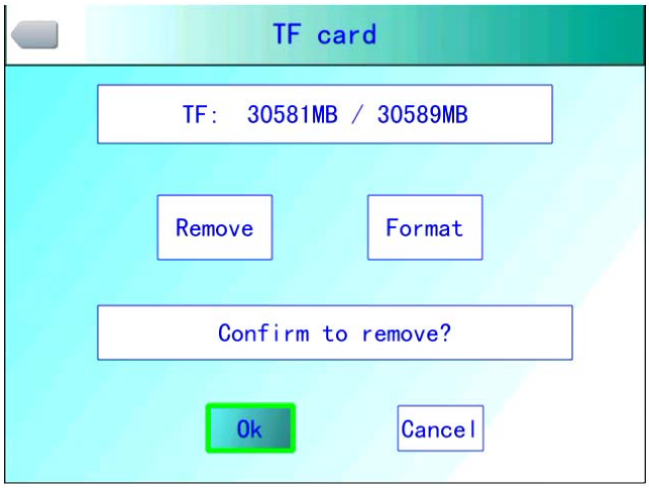
IP Address： This IP address must be the only one, can not be conflicted with the other IP address of the same network segment.

Sub network mask： Divide the segment of the sub network.

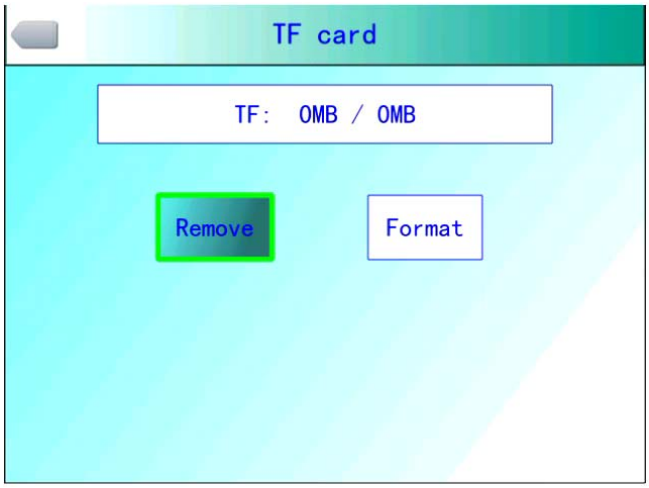
Default network gateway： Set the gateway address to realize the communication among different segment.

Link type： Default 10M/100M self-adapt, 10M、100M.

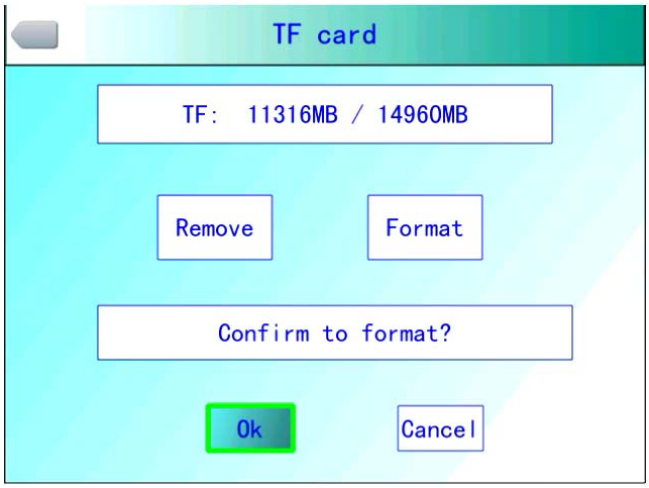
4.6.5 TF Card Management



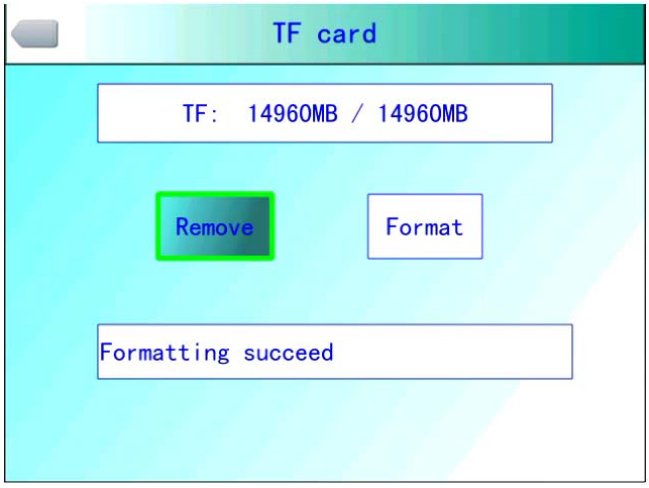
TF Card Management Figure



TF Unload



TF Card Format Figure



TF Card Format Successful

Press the Enter key to pop up floating panel, then select "Settings" option to activate the main menu, select the "TF Card Management item in the setup menu.

Unload： Unload TF card.

Format： This function is used to format the TF card. Select the formatting options, pressing the confirm key to format, press cancel or "C" key to cancel the formatting

！Note： Verify that the file is no longer needed or have been backed up before formatting; after formation, the saved thermal imaging pictures will be lost unrecoverable. If format by PC, please select FAT16 to format the card.

4.6.6 Photo Setting

Photo Setting Manu

Pressing confirm key to pop up the floating panel, then select "Settings" option to activate the main menu, selected the camera settings option

Associated Pictures： This function is to associate the infrared images with digital image, to save the picture together.

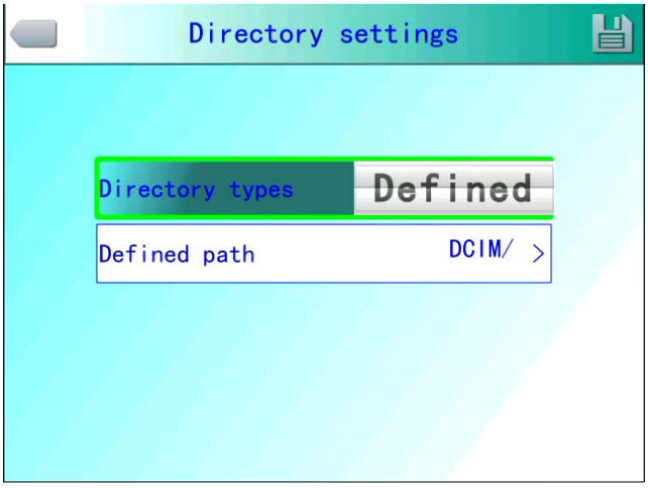
Image annotation mode： This option has two kinds of annotations,audio annotations and text annotations. Audio annotations is to add voice when you save the picture; text annotation is to add text messages when save the image.

CS Shots： Set Continuous capture the number of sheets can be set for 1, 3, 5, 10 shot.

Continuous Capture Interval： can be 0.5s or 1s.

Record Time： can set 1、3、5、10 or 15 minutes to shut off the recording.

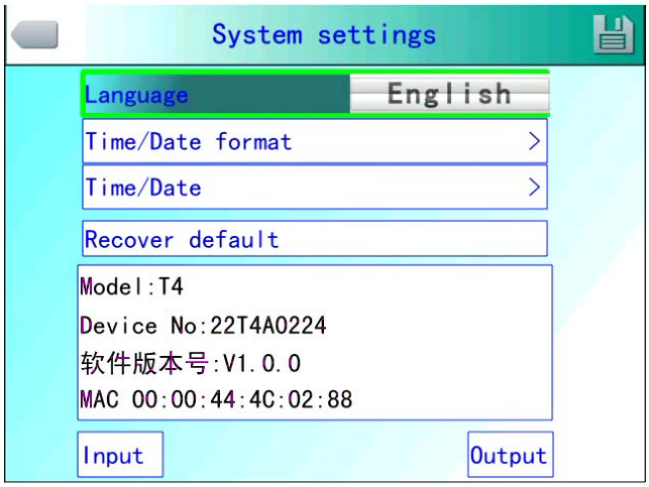
Manu Setting：



Manu Setting

Set the path to save the file, directory type can be set by custom, by month, by date. In preview mode, the playback file path set by directory type.

4.6.7 System Setting

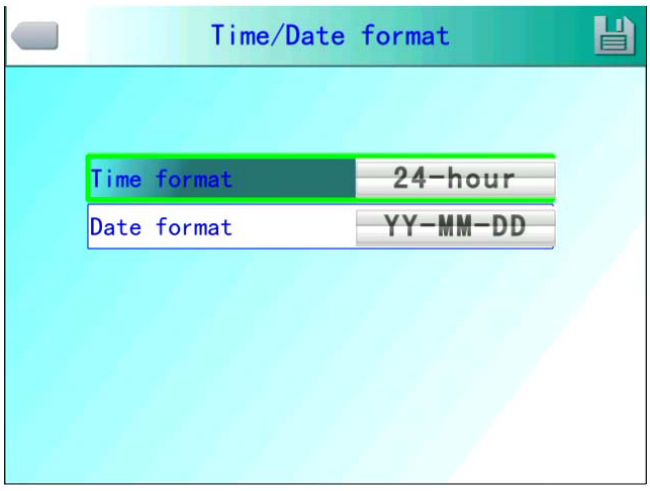


System Setting Manu

Press the Enter key to pop up "Settings" option to activate the main menu, select "System Settings" item in the setup menu. Users can customize the set system language, time / date formats, time / date, restore the factory value items. Pressing the up/down key to switch the setting, use left and right arrow keys to set the contents of the setting. The ">" indicates that there’s a lower-level menu, use right-click to enter.

Language： Set the languages

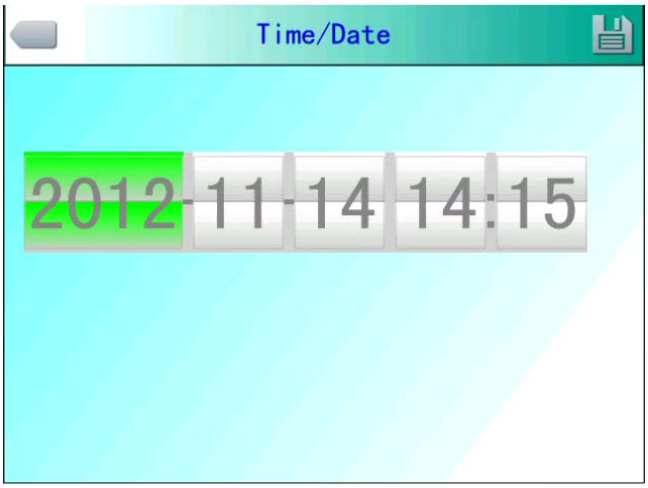
Time / Date Format：



Time/Date Setting Manu

Change the format of the time/date

Time Setting:



Time Setting Manu

Customer can via the Time Setting manu to set the thermal imaging camera’s time. After the setting, the data the time will be saved.

Users can customize to set the year, month, day, hour, minute entries. Press the left and right key to do the settings.

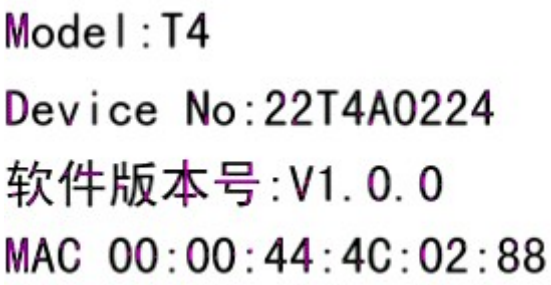
! Note: When left unused for a long time, due to the limited internal battery power, the thermal imaging camera need to re-adjust the system time.

Restore the factory settings: This function is used to restore the factory settings. Pressing the confirmation button, the setting manu will come up, continue to press the confirm key system to restore the factory settings. When pressing the cancel button to exit, the restore the factory settings will be cancelled. The details of the thermal imaging camera’ factory parameters listed please see the Annex parameter table.

Recover Factory Setting

! Note： Recover factory setting will cancel all user-defined parameters.

System Version Info：



System Version Figure

Display thermal imaging device model, device number, software version number and MAC address

Import: New TF card the Create DCIM / Import directory on the TF card, import the fixed file name as PicNote.cfg

File Name Form：

[Note]

Note1 =

Note2 =

Note3 =

Each line is not more than 20 words. After the import is complete, restart the instrument to take effect.

Export: TF card, make sure the TF card is in the machine, then select the menu and then click the Export button to export the contents stored in the TF card the DCIM / Export directory.

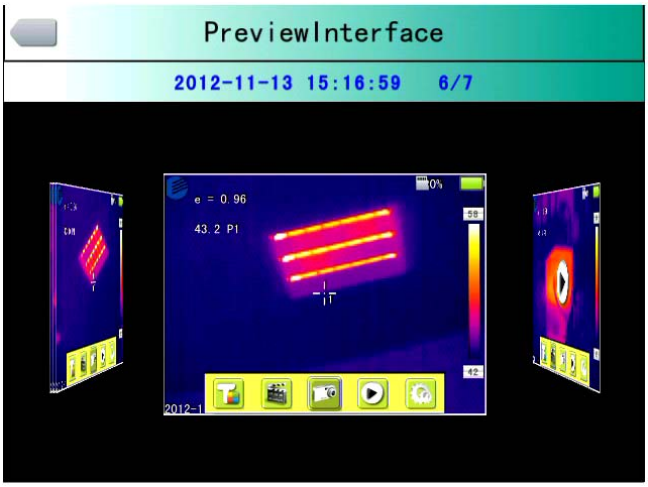
4.7 File Management

4.7.1 Playback

Two modes of playback：

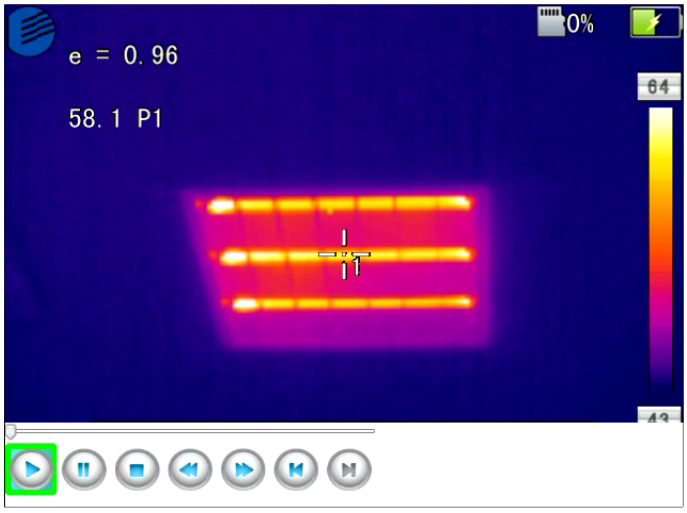
File Management Figure

1、 File management mode: press the Enter key to pop up floating panel select "Settings" option to activate the main menu, select the file management menu in the setup menu, press the confirm button to open the infrared image in the storage. The image arrangement format has abalone grid , press the upper, lower, left, and right arrow keys can switched the stored image. Pressing the "C" key to exit open image and return to the measurement state.



Preview Mode Figure

2、 Preview mode: press the OK button to pop-up floating panel to select "Preview" option, enter the preview mode. Through the left and right keys to switch selection, selected press the OK button to enter the playback. Pressing the "C" key to exit open image and return to the measurement state.



Video Playback Interface

Video playback interface: Via the left and right key to select the play button on the status bar, press the "confirm" key to take effect on the next key to show and hide the playback status bar (press the "on" button is displayed, press the "next" button is hidden)

The icon buttons from left to right is as follow: play / pause, stop, rewind, fast-forward, the former one, the next.

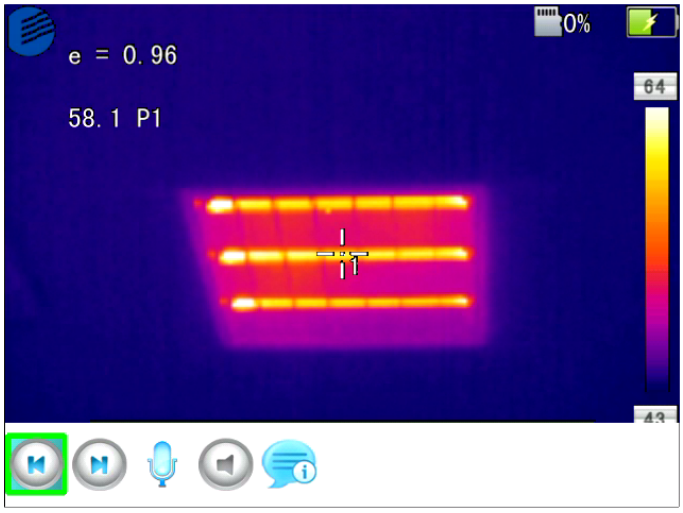


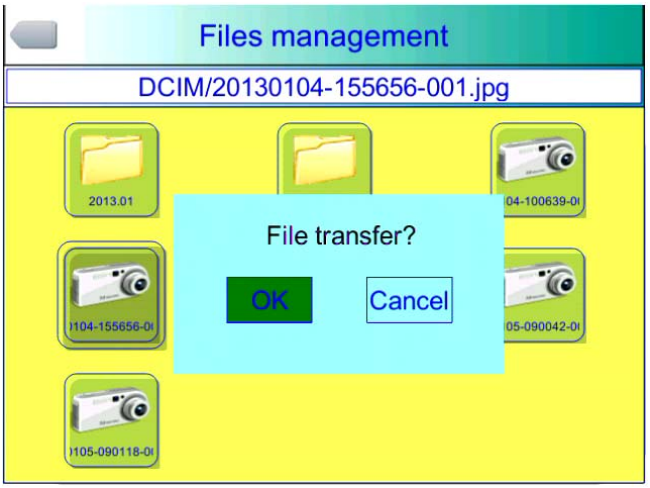
Image Playback Interface

The image playback interface: Via the left, right key to select the play button on the status bar, press the "confirm" key to take effect on the next key to show and hide the playback status bar (press the "on" button is displayed, press the "next" button is hidden)

The icon buttons from left to right is as follows: the former one (above), the next (paragraph), sound recording, voice playback, text playback.

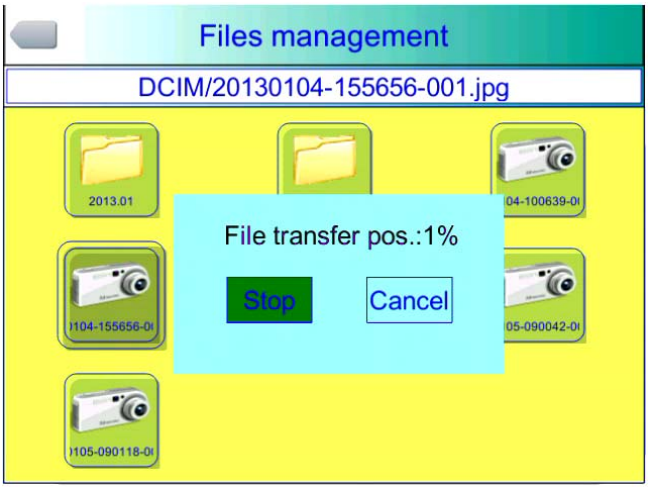
4.7.2 Bluetooth Transmission

This function is used to transfer the stored images on TF card. First, turn on Bluetooth, then open the file manager, and the arrow keys to select the files you want to transfer and Bluetooth transmission prompt box pops up, press the "A" key, as shown below:



Bluetooth Transmission Figure

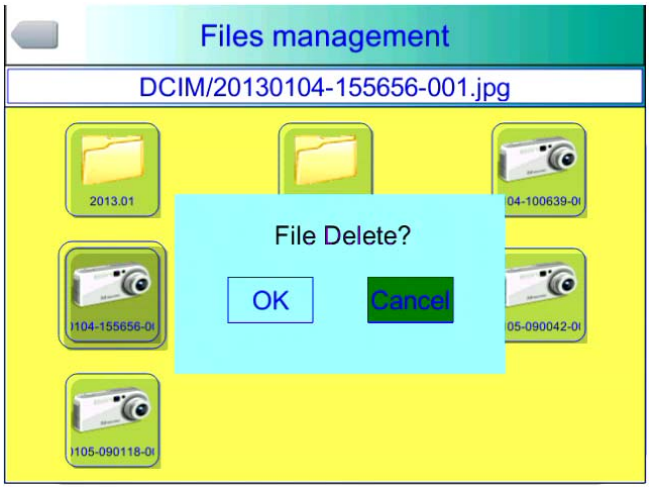
Press confirm key, will show the progress bar, as shown below:



Transmission Progress Bar

4.7.3 Delete

This function is used to delete data stored in files on the TF card. Open File Manager by the up and down keys to select the file you want to delete, press the "S" key to bring up the prompt box, delete the currently selected image files when the Enter key is pressed, the image voice or text comments will also be deleted, then press the "C" key to undelete



File Delete Figure

！Note: Before deletion, make sure that the file is no longer needed or have backup, the deleted image can not be recovered

5 Configuration

Item		Technical Specification	
		LT4	LT8
Detector	Type	Un-cooled FPA micro-bolometer	
	Array size	160*120	384*288
	Pixel Pitch	25μm	
	Spectral range	8-14μm	
	Frame rate	50Hz	
	Thermal sensitivity	0.06℃@30℃	
Lens	FOV	25°×19°	
	Min Focus Distance	10cm	
	Focus	Manual	
	Option Lens	0.5x/2x	
	Interface Type	Screw Type	
Image	IFOV	2.73mrad	1.37mrad
	Zoom	2×、4X	
	CCD	3 million pixel，CMOS module	
	Frame Rare	50HZ/60HZ，	
	Video Output	PAL / NTSC	
Image Display	LCD display	3.6″TFT LCD，640*480，touch screen	
	Color Palette	11 color palette for option	
	Image adjustment	Auto/manual to adjust brightness, contrast	
	Image	Fast switch between infrared image and ccd image, with fusion function.	
	Image Enhance	Auto/manual enhance mode	
Measurement	Range	-20℃~+350℃	-20℃~+600℃，(two range)
		Extend to 1000℃	Extend to1200℃
	Accuracy	± 2 °C or ± 2% of reading, Whichever is greater	
	Measurement Correction	Auto / Manual	
	Mode	Up to 5 movable spots. Up to 5 movable areas(maximum, minimum and average temperatures). Up to 2 movable lines. Line profile. Isotherms. Temperature difference. Alarm(voice, color)	
	Emissivity correction	Variable from 0.01 to 1.0	
	Background Tem correction	Auto	
	Atmospheric transmission correction	Automatic correction according to user input object distance, humidity and temperature	
	Setting Option	Time/Date, ℃/℉/K, language, brightness/contrast, LCD brightness, IP address	
Image Storage	Card	2GB Micro TFcard，max 32GB	
	Mode	Auto/manual saving, single thermal images and ccd image association, thermal video and ccd association, thermal and ccd fusion function.	

	Format	JPEG format H.264 format
	CCD image format	JPEG、H.264，include fusion
	Voice annotation	60s, saved together with the image
	Text annotation	can upload
	File Manu	can upload
Power source	Battery type	Li-Ion, rechargeable
	Battery operating time	3 hours continuous operation
	charging	Intelligent charge or power adaptor or 12v car power charge
	Charging time	1.5 hour to 50% full
	Power saving	auto sleep, auto shut down
Interface	SD card slot	Micro SD（TF）slot
	Net	Mini-USB
	power	（DC12V）
	video	yes
	Auto/data	Bluetooth(earphone/RS232)
other	Mic	yes
	buzzer	yes
	Flash light	2 LED
	Laser point	red，1mw/635nm，two level，IEC60285
	Triple	1/4″-20-UNC
	Hand strap	Can install on two side
	Lens cover	yes
	Sky shade	yes
Environment	Operation temperature	-15℃~+50℃
	Save temperature	-40℃~+70℃
	Humidity	≤90%
	Encapsulation	IP54
	Shock resistance	25G，IEC68-2-29
	Vibration resistance	2G，IEC68-2-6
	Drop resistance	2 meters
Dimension	Dimension	105x230x245mm
	weight	980g

6 Troubleshooting

Please follow the table below to diagnose and correct the problem. If problem still exists, please contact our service department （400-887-1897）.

Problem	Cause & Solution
The camera does not power on.	● Battery not installed or installed incorrectly →Install battery or re-install battery ● Battery is out of power. →Change battery. ● "Power off" protection is enabled →Wait for 5 seconds and reboot.
The camera powers off automatically.	● Battery is out of power. →Change battery ● AutoOffTime option is enabled →Set as None.
Battery depletion is too fast	● Environmental temperature is too low ● Rechargeable battery is not charged completely. →Recharge the battery. ● Rechargeable battery is out of power completely and cannot be recharged. →Change to new battery.
No thermal image	● Lens cover is not removed. →Remove lens cover. ● In image freeze status →Press C key to exit.
Thermal image is white-black.	● White-black palette is selected →Select normal palette.

Appendix A

Common material emissivity (FYI)

Material	Surface	Temperature°C	Emissivity (ε)
Aluminum	Non- oxidized	100	0.20
	Oxidized	100	0.55
Brass	Burnished to Brown	20	0.40
	Dull luster	38	0.22
	Oxidized	100	0.61
Copper	Seriously Oxidized	20	0.78
Iron	Oxidized	100	0.74
	Rusty	25	0.65
Cast iron	Oxidized	200	0.64
	Non- Oxidized	100	0.21
Wrought iron	Quarry-faced	25	0.94
	Polished	38	0.28
Nickel	Oxidized	200	0.37
Stainless steel	Oxidized	60	0.85
Steel	Oxidized	200	0.79
Common brick	Surface	20	0.93
Concrete	Surface	20	0.92
Glass	Polished plate	20	0.94
Lacquer	White	100	0.92
	Black	100	0.97
Carbon	Smoke black	25	0.95
	Candle soot	20	0.95
	Rough lead surface	20	0.98
Oil paint	Value of 16 colors	100	0.94
Paper	White	20	0.93
Sand soil	Surface	20	0.90
Timber	Dressed	20	0.90
Water	Distilled water	20	0.96
Skin	Human	32	0.98
Ceramic	Thin	21	0.90
	Thick	21	0.93

Appendix B

Factory default parameter setting table

Table.1 Measurement temperature setting table

Parameter	Value	
	LT4	LT8
Temperature Range	-20 ~ 350°C	-20 - 180°C
Lens	Standard	
Temp Unit	°C	
Ref Type	Off	
Ref Temp	30°C	

Table.2 Measurement temperature correction table

Parameter	Value
Emissivity	0.96
TCorrect	0°C
TAmbient Temp	Off

Table.3 Analysis setting table

Parameter	Value
Temp Alarm	Off
Alarming Temp	50.0°C
Alarming Color	None
Isotherm Color	Off
Isotherm Temp	50.0°C
Isotherm Width	1.0°C

Table.4 System setting table

Parameter	Value
Language	English
Brightness	60S
Auto Calib	60%
Video Mode	Laser sight
Quick Access	NTSC
StandbyTime	5 mins
AutoOffTime	15 mins

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